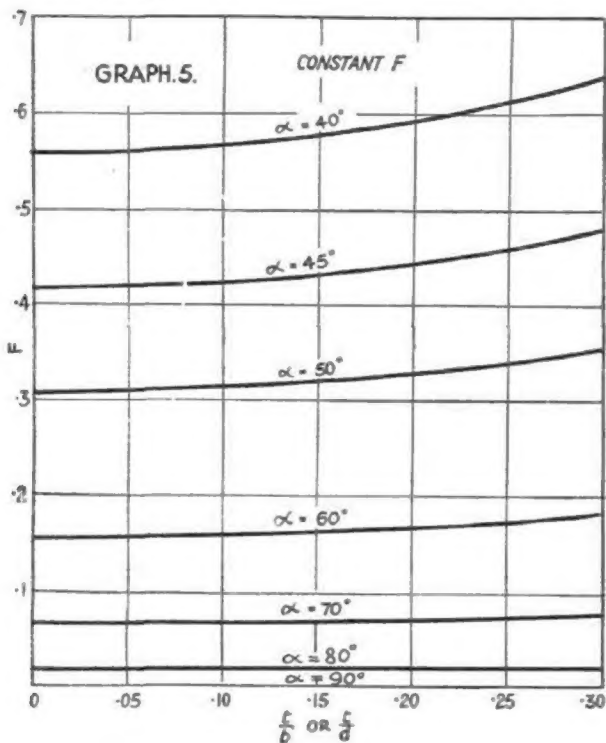


THE AIRCRAFT ENGINEER

$$\begin{aligned} \therefore \frac{y}{d} &= \frac{d+b}{b+2d} \\ \therefore \frac{y}{d} &= \frac{1+\frac{b}{d}}{1+2\left(\frac{d}{b}\right)} \end{aligned} \quad \dots \quad (1)$$

$$\begin{aligned} I_{xx} &= \frac{2}{3} \times td^3 + \frac{bt^3}{12} + tbd^2 - Ay^2 \\ &= t\left(\frac{2d^3}{3} + \frac{bt^2}{12} + bd^2\right) - Ay^2 \end{aligned}$$



Assume that t is small compared with b and d and neglect terms involving t^3 :—

$$\begin{aligned} \text{Then } I_{xx} &= t\left(\frac{2d^3}{3} - 3bd^2\right) - Ay^2 \\ \therefore \frac{I_{xx}}{A} &= \frac{2d^3 + 3bd^2}{3(b+2d)} - y^2 \end{aligned}$$

TABLE 1.

$\frac{b}{d}$	$\frac{y}{d}$	$\frac{I_{xx}}{d}$	$\frac{I_{yy}}{b}$
0	.5000	.2887	.5000
.1	.5238	.3012	.4920
.2	.5454	.3105	.4846
.3	.5642	.3175	.4778
.4	.5833	.3228	.4714
.5	.6000	.3266	.4655
.6	.6154	.3294	.4600
.7	.6296	.3313	.4547
.8	.6429	.3325	.4499
.9	.6552	.3331	.4453
1.0	.6667	.3333	.4410

$\frac{d}{b}$	$\frac{y}{d}$	$\frac{I_{xx}}{d}$	$\frac{I_{yy}}{b}$
1.0	.6667	.3333	.4410
.9	.6786	.3331	.4364
.8	.6923	.3324	.4312
.7	.7084	.3307	.4249
.6	.7273	.3278	.4174
.5	.7500	.3228	.4083
.4	.7778	.3143	.3968
.3	.8125	.2997	.3819
.2	.8571	.2736	.3619
.15		.2522	
.1	.9167	.2205	.3333
.05		.1680	
0	1.0	0	.2887

TABLE 2.

Section.	Fig.	A.	I_{xx}	I_{yy}	Corrections.					
					To A.				To I_{xx} for thickness and slope.	To I_{yy} for thickness and slope.
					For bend per bend.	For fillet per fillet.	For rounded corner per rounded corner.	For slope.		
Channel ..	1	$t(b+2d)$	Ak_{xx}^2	Ak_{yy}^2	$-.43t^2\left(\frac{r}{t}+\frac{1}{2}\right)$	$+.215r^2$	$-.215r^2$	—	$+\frac{bt^3}{12}$	$+\frac{dt^3}{6}$
Channel ..	2	$t(b+2d)$	—	Ak_{yy}^2	$-t^2\left(\frac{r}{t}+\frac{1}{2}\right) \times B$	$+\frac{1}{2}r^2 \times B$	$-\frac{1}{2}r^2 \times B$	$+b \times D$	—	$+\frac{dt^3}{6} + \frac{tb^3}{12} \times F$
Z-section ..	3	$t(b+2d)$	—	Ak_{yy}^2	$-.43t^2\left(\frac{r}{t}+\frac{1}{2}\right)$	$+.215r^2$	$-.215r^2$	—	—	$+\frac{dt^3}{6}$
Z-section ..	4	$t(b+2d)$	—	Ak_{yy}^2	$-t^2\left(\frac{r}{t}+\frac{1}{2}\right) \times B$	$+\frac{1}{2}r^2 \times B$	$-\frac{1}{2}r^2 \times B$	$+b \times D$	—	$+\frac{dt^3}{6} + \frac{tb^3}{12} \times F$
H-section ..	5	$t(b+2d)$	—	Ak_{yy}^2	—	$+.215r^2$	$-.215r^2$	—	—	$+\frac{dt^3}{6}$
H-section ..	6	$t(b+2d)$	—	Ak_{yy}^2	—	$+\frac{1}{2}r^2 \times B$	$-\frac{1}{2}r^2 \times B$	$+b \times D + 2d \times D$	—	$\frac{dt^3}{6} \times E + \frac{tb^3}{12} \times F$
Angle ..	7	$\frac{1}{2}t(b+2d)$	Ak_{xx}^2	—	$-.43t^2\left(\frac{r}{t}+\frac{1}{2}\right)$	$+.215r^2$	$-.215r^2$	—	$+\frac{bt^3}{24}$	—
T-section ..	8	$\frac{1}{2}t(b+2d)$	Ak_{xx}^2	—	—	$+.215r^2$	$-.215r^2$	—	$+\frac{bt^3}{24}$	—
T-section ..	9	$\frac{1}{2}t(b+2d)$	Ak_{xx}^2	—	—	$+\frac{1}{2}r^2 \times B$	$-\frac{1}{2}r^2 \times B$	$+\frac{b}{2} \times D$	$\frac{bt^3}{24} \times E$	—
V-section ..	10	$t(b+2d)$	Ak_{xx}^2	—	$-t^2\left(\frac{r}{t}+\frac{1}{2}\right) \times B + t^2\left(\frac{r}{t}+\frac{1}{2}\right) \times C$	$+\frac{1}{2}r^2 \times B$	$-\frac{1}{2}r^2 \times B$	$+2d \times D$	$+\frac{bt^3}{12} + \frac{td^3}{6} \times F$	—